DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND
NAVAL AIR SYSTEMS COMMAND HEADQUARTERS
WASHINGTON, DC 20361 -0001

IN REPLY REFER TO
NAVAIRINST 4790.21
AIR-411
4 Oct 89

NAVAIR INSTRUCTION 4790.21

From: Commander, Naval Air Systems Command

Subj: FLIGHT INFORMATION RECORDING AND MONITORING SYSTEMS

Ref: (a) Interface Control Document for Flight Information Recording and Monitoring Systems (O, I, D) with NALDA of 31 May 89
(b) MIL-STD-2173(AS) Reliability Centered Maintenance (RCM)
(c) NAVAIRINST 4790.3A, Scheduled Removal Component (SRC)/Equipment History Record (EHR) Program (NOTAL)
(d) MIL-STD-1559A Assignment of Serial Numbers for Aircraft Gas Turbine Engines and Engine Modules
(e) NAVAIRINST 5230.11, Fleet Aviation Logistics Information Systems Functional Management Manual (NOTAL)

1. Purpose. To establish Naval Air Systems Command (NAVAIR) policy and standardize requirements for the management of non-tactical data collected by aircraft on-board monitoring systems to improve the feedback of maintenance and diagnostics data.

2. Cancellation. This NAVAIR Instruction cancels NAVAIR Notice 4790 Ser AIR-41142 of 25 January 1988.

3. Background. The collection and use of maintenance data generated during flight is important to the implementation of aviation weapon systems maintenance policy. These data provide for a rapid feedback of maintenance and diagnostic data to aid organizational (O), intermediate (I), and depot (D) level maintenance personnel in the performance of maintenance tasks. It also satisfies higher level command reporting requirements, commonly referred to as "up line," primarily through the Naval Aviation Logistics Data Analysis (NALDA) system for use in the performance of detailed analysis.

4. Scope. This instruction applies to all Naval Air Systems Command Headquarters (NAVAIRHQ) Program Managers Air (PMA's), Systems Program Managers (SPM's), Assistant Program Managers

for Logistics, Assistant Program Managers for Systems and Engineering, and cognizant airframe, avionics, and engine managers who are involved with the collection of aircraft fatigue, engine and avionics data, and the tracking and monitoring of life limited components.

5. Policy

a. A standardized I-level software package for a common I-level ground station will be developed that will interface with the O-level aircraft data systems and allow for a common upline storage of historical data. Where practical the O-level and I-level will use common hardware. Reference (a) details the standard interface requirements that will be followed to facilitate the data collection and transmission process between systems (i.e., O-level to I-level, I-level to NALDA, D-level to NALDA).

b. The NALDA system will be used for upline reporting and to maintain the Fleet Serial Number Tracking (SNT) central data base. As specified in reference (a) the O-level and I-level continental U.S. sites, ships, and overseas locations will pass their data to NALDA at least every 2 weeks. Systems with the means to pass data to NALDA electronically will do so on a daily basis.

c. The structural fatigue usage data resident on the airborne data storage unit (DSU) will be compiled by the reporting custodians (O-level) and reported to the Naval Air Development Center, (Code 6042), Warminister, PA, by the 1st day of each month.

d. All assets on the aircraft which track or collect fatigue data and Life Usage Indices (LUI's) data will be designated as mission critical unless a fully redundant system is provided.

e. The removal, collection, and processing of the maintenance data generated during a flight must be incorporated as part of standard maintenance procedures. This is to ensure the timely processing and accurate determination of both preventative and corrective maintenance actions.

f. The LUI values computed by each aircraft will be normalized to a factor between 0 to 100 prior to report generation. This will promote commonality between aircraft types and alleviate confusion in the interpretation of the values.

1831 2

2

g. The initial list of life limited parts to be tracked will be established using the Reliability Centered Maintenance (RCM) methodology, reference (b). Any additions or deletions as a result of RCM analysis will be subject to a review by the Flight Information Recording and Monitoring Systems Operational Advisory Group (OAG).

h. Serialized, fatigue, and life limited components will be tracked utilizing the automated ground station or the appropriate maintenance document as stated in reference (c).

i. Reference (d) will be incorporated into all hardware contracts for the assignment of serial numbers to engines and modules. Additionally, the serial number will be entered into the ground station data base exactly as it appears on the data plate. This will allow for the accurate tracking of the life limited components within the ground station data base.

j. Engineering Change Proposals (ECP's) shall be analyzed as to their effect on any of the factors used in the LUI algorithm. If multiple ECP's are being processed for the same engine or airframe, they not only must be analyzed singularly but also as a total package.

6. Responsibilities

a. Logistics Management Division (AIR-410) will

(1) ensure appropriate guidance and procedures are incorporated into maintenance documentation (i.e., technical manuals, MRC's, etc.) at the O, I, and D levels to reflect the use of in-flight maintenance data in the performance of maintenance tasks;

(2) ensure new aircraft and engine procurement contracts require commercial activities who manufactured the hardware system to initially input the life limited parts into the SNT data base within NALDA and any changes, as appropriate, during interim support;

(3) generate user requirements and the system technical and logistics requirement concept;

(4) ensure that user requirements are met during both the hardware and software development and life cycle support stages;

(5) coordinate the implementing acquisition plan, statements of work, and procurement contract with NAVAIRHQ (AIR-411); and

(6) be a member of the OAG chaired by NAVAIRHQ (AIR-552).

b. Logistics and Maintenance Policy Division (AIR-411) will

(1) review applicable system specifications, statements of work, and procurement requests to ensure that the requirements in reference (a) are included;

(2) maintain and update the Interface Control Document (ICD), reference (a), that will be integrated into the software development contract of the ground processing station, support the transmission requirements of all type/model/series aircraft, and specifies the O-level to I-level and the I and D-level to NALDA interfaces;

(3) approve all data elements that are passed to the SNT data base;

(4) develop the interface specification requirements necessary for the uplining of data from the ground processing station to NALDA and any interfaces needed with other fleet information systems, such as the Naval Aviation Logistics Command Management Information System;

(5) ensure that the functions being performed by the ground station are not duplicative of existing or planned aviation logistics management information systems as specified in reference (e); and

(6) be a member of the OAG. The NALDA Central Design Agent will provide a technical advisory member to the board.

c. Deputy Assistant Commander for Aviation Depots (AIR-43) will be responsible for ensuring that the Navy and commercial depots input removals and installations of engines, modules, and components into NALDA and any part number changes as a result of technical directives prior to the transfer of an aircraft or engine.

d. Systems Engineering Management Division (AIR-511) will

(1) enforce the disciplines described in this instruction on the aircraft design process and ensure reference (a) and associated interface control documents are clearly addressed in aircraft specifications, acquisition plans, statements of work, and procurement contracts; and

(2) coordinate the establishment of the life cycle support of the O-level ground station application software.

e. Air Vehicle Division (AIR-530) will

(1) be responsible for the structural life management of naval aircraft and maintain the structural life limits of the basic airframe structure and critical components;

(2) be responsible for managing all technical aspects of aircraft structural fatigue life monitoring systems relative to the collecting, analyzing, and reporting of individual aircraft usage history data;

(3) be a member of the OAG;

(4) generate the aircraft structural fatigue life monitoring requirements for the O and I level software for the ground processing station and ensure that these requirements are met during the software development and life cycle support phases;

(5) act as the technical lead, with assistance from NAVAIRHQ (AIR-552), and direct the (technical and logistic, including life cycle supportability) development of the O-level ground station application software associated with aircraft structural fatigue life monitoring systems relative to the collecting, analyzing, and reporting of individual aircraft usage history data; and

(6) ensure that O-level ground station application software meets the requirements of reference (a).

f. Propulsion and Power Division (AIR-536) will

(1) coordinate all new engine procurements and power plant ECP's with NAVAIRHQ (AIR-411) to ensure compatability with the interface requirements specification (reference (a));

(2) analyze all power plant ECP's for any possible effects to the algorithm that calculates the LUI value;

(3) generate the engine/mechanical propulsion requirements for the O and I level ground processing station software, and ensure that these requirements are met during both the software development and life cycle support phases;

(4) act as technical lead, with technical assistance from NAVAIRHQ (AIR-552), and direct the (technical and logistic, including life cycle supportability) development of the O-level ground station applications software associated with monitoring individual aircraft type engines and other propulsion and power system components (e.g., gearboxes, transmissions, drivetrains, APU's generators, etc.);

1831

5

(5) ensure that O-level ground station application software meets the requirements of the ICD, reference (a);

(6) act as technical lead and provide direction to ensure that O-level applications software correctly interacts and is compatible with airborne propulsion systems software and installation requirements; and

(7) co-chair the OAG with NAVAIRHQ (AIR-552) during both the software development and life cycle support phases.

g. Avionics and Computer Resources Division (AIR-546) will

(1) be responsible for the life cycle management of naval aircraft avionics systems and related components;

(2) act as technical lead for avionics components life monitoring systems relative to the collecting, analyzing, and reporting of individual component usage history data;

(3) be a member of the OAG;

(4) generate the avionics components life monitoring requirements for the O and I-level software for the ground processing station and ensure that these requirements are met during both the software development and life cycle support phases;

(5) act as technical lead, with technical assistance from NAVAIRHQ (AIR-552), and direct the (technical and logistic, including life cycle supportability) development of the O-level ground station application software associated with the avionics components' life monitoring relative to the collecting, analyzing, and reporting of individual component usage history data; and

(6) ensure that the O-level ground station application software meets the requirements of the ICD.

h. Support Equipment Division (AIR-552) will

(1) act as the system level procurement agent for all ground processing stations in order to standardize inflight maintenance data and aircraft component usage history data;

(2) ensure that the ICD, reference (a), is incorporated as part of the procurement requirements for the development of the O, I, and D-level software;

1831

6

6

(3) act as the single point of contact for integrating all user requirements (O, I, D maintenance levels and NALDA);

(4) ensure that the ground station system design supports the requirements as defined by NAVAIRHQ (AIR-530), (AIR-536), and (AIR-546);

(5) ensure all unique ground station requirements are approved by the NAVAIR Commonality Control Board prior to any procurement action;

(6) provide technical assistance to NAVAIRHQ (AIR-530), (AIR-536), and (AIR-546) in the development of O-level ground station application software to ensure that these requirements are supported for the life cycle and to maximize standardization of the aircraft-to-ground station hardware and software interfaces;

(7) act as technical lead, with assistance from NAVAIRHQ (AIR-530), (AIR-536), and (AIR-546), and direct the development of ground station hardware, DSU interfaces, operating systems software, I/D level software, and upline interface software;

(8) ensure that maximum user participation is available during the software functional requirements definition, development, and life cycle support phases of the ground station system (e.g., user requirements groups, fleet evaluations after incremental software builds, software trouble reporting procedures meetings, etc.);

(9) act as NAVAIR lead on life cycle support of the ground station system hardware and software and co-chair the OAG meetings with NAVAIRHQ (AIR-536);

(10) chair a Configuration Control Board to review requested changes to the ground station hardware and software and forwarding requests that impact the NAVAIRHQ (AIR-411) interface specification (reference (a)) to NAVAIRHQ (AIR-411) and other cognizant NAVAIR groups for impact assessment; and

(11) develop and monitor an ICD to maximize standardization of the aircraft to ground station hardware and software interfaces.

i. PMA's and SPM's will

(1) ensure that NAVAIRHQ (AIR-411) concurs on all applicable specifications and procurement requests on new and modified aircraft and engine procurements; and

(2) ensure that reference (d) is incorporated into all hardware contracts for the assignment of serial numbers to engines and modules.

7. Action. This instruction will be adhered to by all NAVAIRHQ cognizant codes and airframe and engine managers involved in the design, development, and fleet implementation of automated aircraft structural fatigue, engine, and avionic monitoring systems.

R. D. FRIICHTENICHT
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1831 8

8